## CLAIMS

I claim:

1. A motor-generator system with a current control feedback loop for enhanced efficiency comprising:

a housing defining an interior space, said housing having a first portion and a second portion;

an electric motor assembly positioned within said first portion of said housing, said electric motor portion being operationally coupled to a shaft member, said electric motor assembly selectively rotating said shaft member;

an electric generator assembly operationally coupled to said shaft member said electric generator assembly converting mechanical rotation into electrical energy, said electric generator assembly being positioned within said second portion of said housing, said electric generator assembly having a current output for supplying electrical current;

and

a control assembly operationally coupled between said electric generator assembly and said electric motor assembly said control assembly providing a control current to said electric motor assembly for controlling a speed of rotation induced into said shaft member by said electric motor assembly.

2. The system of claim 1, wherein said electric motor assembly further comprises:

a stator assembly operationally coupled to said first portion of said housing, said stator assembly having a plurality of magnetic members, said stator assembly being operationally coupled to said control assembly; and

a rotor assembly positioned within said first portion of said housing, said rotor assembly being operationally coupled to said shaft member.

3. The system of claim 2, wherein said rotor assembly further comprises at least one fly wheel assembly, said fly wheel assembly having at least one magnetic drive wheel with a plurality of magnetic assemblies dispersed in a linear array along a perimeter side wall of said at least one magnetic drive wheel assembly being operationally coupled to said shaft member whereby rotation of said magnetic drive wheel causes said shaft member to rotate.

4. The system of claim 3, wherein said at least one magnetic drive wheel further comprises a plurality of bores extending radially into said perimeter side wall, each one of said bores being for receiving an associate one of said plurality of magnetic assemblies.

5. The system of claim 4, further comprising a plurality of apertures extending through a first side of said magnetic drive wheel into an associated one of said bores for selectively receiving a securing member to secure and associated one of said magnetic assemblies into said associated one of said plurality of bores.

6. The system of claim 3, wherein said at least one magnetic drive wheel further comprises a plurality of voids extending from a first side of said magnetic drive wheel through to a second side of said magnetic drive wheels, said voids providing weight reduction for said flywheel.

7. The system of claim 6, wherein said plurality of voids being positioned symmetrically through said at least one magnetic drive wheel to maintain rotationally balance of said at least one magnetic drive wheel.

8. The system of claim 7, wherein said plurality of voids comprises four voids.

9. The system of claim 3, wherein said at least one magnetic drive wheel comprises a polymeric material to minimize weight of said at least one magnetic drive wheel.

10. The system of claim 3, wherein each one of said plurality of magnetic assemblies further comprises:

a rare earth magnetic having a generally cylindrical form;

a bottom cap member operationally coupled to said rare earth magnet; and

a perimeter wall extending upward from said bottom cap member and substantially enveloping a perimeter of said rare earth magnet.

11. The system of claim 10, wherein said perimeter wall has a notch portion extending downward from a top edge of said perimeter wall.

12. The system of claim 10, further comprising a top cap member operationally coupled to said perimeter wall, said to cap member abutting a top portion of said rare earth magnet.

13. The system of claim 12, wherein said top cap member being an arcuate segment.

14. The system of claim 13, wherein an outer edge of said arcuate segment top cap member extending through an arc of between 45 and 180 degrees inclusive.

15. The system of claim 13, wherein an outer edge of said arcuate segment top cap member extending through an arc of 80 degrees.

16. The system of claim 3, wherein each one of said plurality of magnetic assemblies further comprises:

a rare earth magnetic having a generally cylindrical form;

a bottom cap member operationally coupled to said rare earth magnet; and

a perimeter wall extending upward from said bottom cap member and substantially enveloping a perimeter of said rare earth magnet, said perimeter wall has a notch portion extending downward from a top edge of said perimeter wall;

a top cap member operationally coupled to said perimeter wall, said to cap member abutting a top portion of said rare earth magnet, said top cap member being an arcuate segment;

wherein an outer edge of said arcuate segment top cap member extending through an arc of 80 degrees,

said bottom cap member, said perimeter wall, and said top cap member comprising steel for directing magnetic lines of flux.

17. The system of claim 3, further comprising:

a pair of magnetic drive wheels, each one of said pair of magnetic drive wheels further comprises:

a plurality of bores extending radially into said perimeter side wall, each one of said bores being for receiving an associate one of said plurality of magnetic assemblies;

a plurality of apertures extending through a first side of said magnetic drive wheel into an associated one of said bores for selectively receiving a securing member to secure and associated one of said magnetic assemblies into said associated one of said plurality of bores;

a plurality of voids extending from a first side of said magnetic drive wheel through to a second side of said magnetic drive wheels, said voids providing weight reduction for said flywheel, said plurality of voids being positioned symmetrically through said at least one magnetic drive wheel to maintain rotationally balance of said at least one magnetic drive wheel;

wherein said magnetic drive wheel comprises a polymeric material to minimize weight of said at least one magnetic drive wheel.

18. The system of claim 3, wherein said stator assembly further comprises:

a plurality of rare earth magnets having a general horse-shoe shape with complementary poles portioned on each end of said horse shoe shape;

a plurality of coil members, each one of said plurality of coil members being wrapped around an associated one of said plurality of horse show shaped rare earth magnets, each one of said plurality of coil member being operationally coupled to said control assembly.

19. A motor-generator system with a current control feedback loop for enhanced efficiency comprising:

a housing defining an interior space, said housing having a first portion and a second portion;

an electric motor assembly positioned within said first portion of said housing, said electric motor portion being operationally coupled to a shaft member, said electric motor assembly selectively rotating said shaft member;

an electric generator assembly operationally coupled to said shaft member said electric generator assembly converting mechanical rotation into electrical energy, said electric generator assembly being positioned within said second portion of said housing, said electric generator assembly having a current output for supplying electrical current;

a control assembly operationally coupled between said electric generator assembly and said electric motor assembly said control assembly providing a control current to said electric motor assembly for controlling a speed of rotation induced into said shaft member by said electric motor assembly;

said electric motor assembly having a pair of magnetic drive wheels, each one of said pair of magnetic drive wheels further comprises:

a plurality of bores extending radially into said perimeter side wall, each one of said bores being for receiving an associate one of said plurality of magnetic assemblies;

a plurality of apertures extending through a first side of said magnetic drive wheel into an associated one of said bores for selectively receiving a securing member to secure and associated one of said magnetic assemblies into said associated one of said plurality of bores;

a plurality of voids extending from a first side of said magnetic drive wheel through to a second side of said magnetic drive wheels, said voids providing weight reduction for said flywheel, said plurality of voids being positioned symmetrically through said at least one magnetic drive wheel to maintain rotationally balance of said at least one magnetic drive wheel;

wherein said magnetic drive wheel comprises a polymeric material to minimize weight of said at least one magnetic drive wheel;

wherein each one of said plurality of magnetic assemblies further comprises:

a rare earth magnetic having a generally cylindrical form;

a bottom cap member operationally coupled to said rare earth magnet; and

a perimeter wall extending upward from said bottom cap member and substantially enveloping a perimeter of said rare earth magnet, said perimeter wall has a notch

portion extending downward from a top edge of said perimeter wall;

a top cap member operationally coupled to said perimeter wall, said to cap member abutting a top portion of said rare earth magnet, said top cap member being an arcuate segment;

wherein an outer edge of said arcuate segment top cap member extending through an arc of 80 degrees,

said bottom cap member, said perimeter wall, and said top cap member comprising steel for directing magnetic lines of flux;

wherein said stator assembly further comprises:

a plurality of rare earth magnets having a general horse-shoe shape with complementary poles portioned on each end of said horse shoe shape;

a plurality of coil members, each one of said plurality of coil members being wrapped around an associated one of said plurality of horse show shaped rare earth magnets, each one of said plurality of coil member being operationally coupled to said control assembly.

20. The system of claim 19, wherein a first one of said pair of magnetic drive wheels being offset from a second one of said pair of magnetic drive wheels whereby said magnetic assemblies of said first one of said pair of magnetic drive wheels are not aligned with said magnetic assemblies of said second one of said pair of magnetic drive wheel.

21. The system of claim 20, further comprising:

said magnetic assemblies of said first one of said pair of magnetic drive wheels being aligned with a first end of said horse shoe shaped rare earth magnet of said stator assembly, each one of said magnetic assemblies of said first one of said pair of magnetic drive wheels having a first magnetic polarity, said first end of said horse shoe shaped rare earth magnet of said stator assembly having an identical first magnetic polarity whereby said first end of said horse shoe shaped rare earth magnet of said stator assembly repels each one of said magnetic assemblies of said first one of said pair of magnetic drive wheels; and

said magnetic assemblies of said second one of said pair of magnetic drive wheels being aligned with a second end of said horse shoe shaped rare earth magnet of said stator assembly, each one of said magnetic assemblies of said second one of said pair of magnetic drive wheels having a second magnetic polarity, said second end of said horse shoe shaped rare earth magnet of said stator assembly having an identical second magnetic polarity whereby said second end of said horse shoe shaped rare earth magnet of said stator assembly repels each one of said magnetic assemblies of said second t one of said pair of magnetic drive wheels.

22. The system of claim 19, further comprising:

a first bearing plate positioned at a first end of said first portion of said housing for rotatably receiving a first end of said shaft member;

a second bearing plate positioned at a first end of said second portion of said housing for rotatably receiving a second end of said shaft member; and

said first bearing plate and said second bearing plate roatably supporting weight of said shaft member.

23. The system of claim 22, further comprising a third bearing plate member positioned between said electric motor assembly and said electric generator assembly for rotatably supporting a medial portion of said shaft member.

24. The system of claim 19, further comprising a stand assembly for supporting said housing while said system is in use.

25. The system of claim 24, wherein said stand assembly further comprises:

a base member having a horizontal first surface;

a first cradle member having a vertical support portion extending upwardly from said base member, said first cradle member having an engagement portion for abutting an exterior portion of said housing; and

a second cradle member having a second vertical support portion extending upwardly from said base member, said second cradle member having a second engagement portion for abutting a second exterior portion of said housing.

26. The system of claim 25, further comprising a vertical stanchion member extending between said first cradle member and said second cradle member.

27. The system of claim 24, further comprising a plurality of wheels operationally coupled to said stand assembly for facilitating transport of said system.